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Carbon Dioxide Concentration Indicator

The problem:

An accurate, inexpensive, and reliable device is needed to indicate the amount of carbon dioxide that is concentrated in a closed unventilated area where men may have to function.

The solution:

A proposed device will provide a visual indication of the concentration of carbon dioxide. It consists of small amounts of an absorbent material contained in a semi-permeable membrane and a device to detect color changes. The material will absorb a quantity of carbon dioxide proportional to the CO_2 concentration in the atmosphere. The amount of absorption would be indicated by a color change.

How it's done:

The proposed indicator is a patch or thin package covered with a semi-permeable membrane. It can be mounted in an enclosed area and viewed through a transparent window. The device consists of a reversible absorbent material and a color-changing indicator. The color change is compared to a standard color chip card to find the carbon dioxide partial pressure.

Water, in which carbon dioxide is reversibly absorbed, may be used as the absorbing medium.

In water, CO_2 forms carbonic acid (H_2CO_3) which ionizes to produce a color change in an appropriate hydrogen-ion-concentration indicator dissolved in the water.

Because the amount of CO_2 absorbed in water varies inversely with temperature, different color codes must be used for different temperatures.

The water solution of the indicator may be held by adsorption on the internal surfaces of a porous paint-like film; or it may be held in a thin capsule of translucent film.

This device, which is simple, compact, lightweight, and contains no moving parts, is a considerable improvement over elaborate, expensive systems currently used for the same purpose.

Note:

Requests for further information may be directed to:
Technology Utilization Officer
NASA Headquarters
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Washington, D.C. 20546
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Patent status:

No patent action is contemplated by NASA.

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